

**ARRS'11 (SS22)  
Keynote Talk**

**ARRS  
2011  
CHICAGO**  
ANNUAL MEETING • MAY 1-6  
Springtime is the Best Time

**Sesamoids  
of the Great Toe**

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**Sesamoids of the Great Toe**

4 Key Points  
1) ALWAYS Present

Labels: A 0, X 1, H 0, A 1.2, X 1, H 0, A 50.6, X 5, H 5.6, A 1.8, X 1, H 4, A 9.6, H 2.7, A 6.2, 5.5, X 10, H 26.2, "Fibular Lateral", "Tibial Medial", "100"

"Surgery of the Foot and Ankle"  
Coughlin & Mann  
7th Edition ©1999  
www.Mosby.com  
ISBN 0-323-00327-3  
Fig 10-38

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34 yo Male, came to ER c/o Toe Pain

**Periosteal Reaction!**

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34 yo Male, came to ER c/o Toe Pain

**Sesamoid Destruction!**  
**NO Periosteal Reaction**  
**Cause?**

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34 yo Male, came to ER c/o Toe Pain

**Sharp overhanging edges**  
**Erosion**  
**Gout!**

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34 yo Male, came to ER c/o Toe Pain

**Periosteal Reaction!**  
**Destruction of Lateral Sesamoid**  
**Gout!**

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## Sesamoids of the Great Toe

Imaging  
 ➤ Radiographs

"Crista"  
(Intersesamoidal ridge)

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## Sesamoids of the Great Toe

Imaging  
 ➤ Radiographs  
 ➤ CT  
 ➤ MR

Sesamoid Osteomyelitis

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## Sesamoids of the Great Toe

4 ⇌ Key Points

- 1) Always Present
- 2) Functionally Important  
 ➤ Guide FHL

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## Sesamoids of the Great Toe

4 ⇌ Key Points

- 1) Always Present
- 2) Functionally Important  
 ➤ Guide FHL  
 ➤ Help stabilize 1<sup>st</sup> MTP  
 Prevent Hallux Valgus

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## Hallux Valgus

Normal

$HV \angle < 15^\circ$      $IM \angle < 9^\circ$

Sesamoids anatomic

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## Hallux Valgus

Mild

$HV \angle 15-20^\circ$      $IM \angle 9-11^\circ$

Sesamoids Lat Sublux < 50%

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### Hallux Valgus

Moderate  $HV \angle$   $20-40^\circ$   $IM \angle$   $11-18^\circ$

Sesamoids  
Lat Sublux  
75-100%

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### Hallux Valgus

Severe  $HV \angle$   $>40^\circ$   $IM \angle$   $>16-18^\circ$

Sesamoids  
Lat Sublux  
100%

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### Sesamoids of the Great Toe

4  $\leftrightarrow$  Key Points

- 1) Always Present
- 2) Functionally Important
  - Guide FHL
  - Help stabilize 1<sup>st</sup> MTP
  - Prevent Hallux Valgus
  - Protect MT head cartilage (Similar to the patella)

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### Patella protects femoral cartilage

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### Sesamoids protect MT cartilage

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### Sesamoids protect MT cartilage

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## Sesamoids of the Great Toe

4 ⇌ Key Points

- 1) ALWAYS Present
- 2) Functionally Important
- 3)

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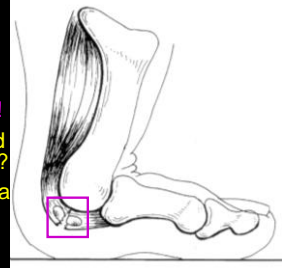
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## Case: 34yoF, 1½ years focal pain

Plantar & lateral 1<sup>st</sup> MT head  
Pain ↑ weight-bearing over area  
Pain ↑ hyperextension of toe



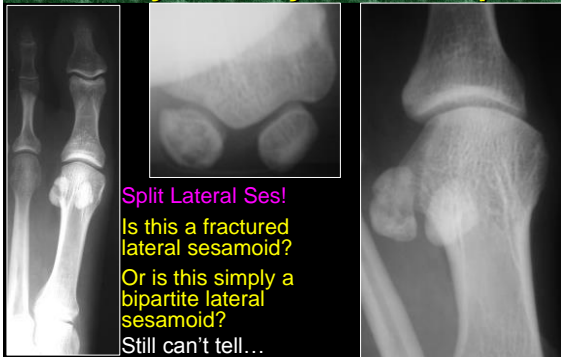
Split Lateral Ses!  
Is this a fractured lateral sesamoid?  
Or is this simply a bipartite lateral sesamoid?



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## Case: 34yoF, 1½ years focal pain



Split Lateral Ses!  
Is this a fractured lateral sesamoid?  
Or is this simply a bipartite lateral sesamoid?  
Still can't tell...

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## Case: 34yoF, 1½ years focal pain

Outside MR...

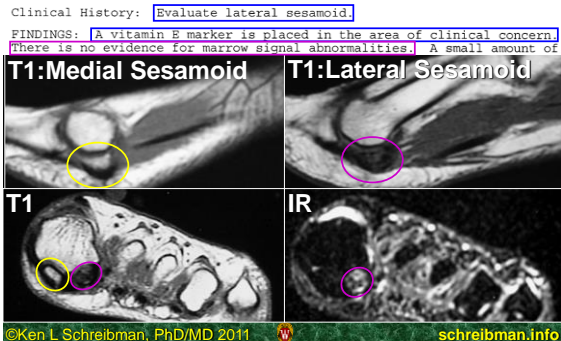
Clinical History: Evaluate lateral sesamoid.  
FINDINGS: A vitamin E marker is placed in the area of clinical concern. There is no evidence for marrow signal abnormalities. A small amount of fluid is noted about the plantar aspect of the proximal metatarsals. There is also some song of fluid noted distally about the dorsal aspect toward the phalanges. No abnormal fluid collection such as ganglion is identified. No soft tissue type mass is seen. The Achilles tendon appears intact. The major ligaments and tendons of the ankle appear intact as well. No evidence for avascular necrosis.  
IMPRESSION: Some joint effusion, but no underlying marrow abnormality. The area of clinical concern marked by a vitamin E marker shows no underlying abnormalities.

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## Case: 34yoF, 1½ years focal pain

Outside MR...



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## Sesamoids of the Great Toe

4 ⇌ Key Points

- 1) ALWAYS Present
- 2) Functionally Important
- 3) Lateral multipartite are RARE

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## Multipartite Sesamoids

REFERENCE	Date	#Pts	MED	LAT
Dobas&Silvers <i>J.Am.Pod.Ass</i> 67:880-2	1977	1000	17%	2%
Burman&Lapidus <i>Arch Surg</i> 22:961-4	1931	1000	12%	<1%
Powers <i>Am.J.Surg</i> 23:315	1934	100	13%	1%
Bizzaro <i>J.Anat</i> 55:256	1921	100	4%	0
Freiberg <i>J.Orthop.Surg</i> 3:453	1920	1000	0.1%	0
Kewenter <i>Acta Orthop.Scand. Suppl.</i> 2:1-113	1936	800	~30%	~1%

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## Multipartite Sesamoids

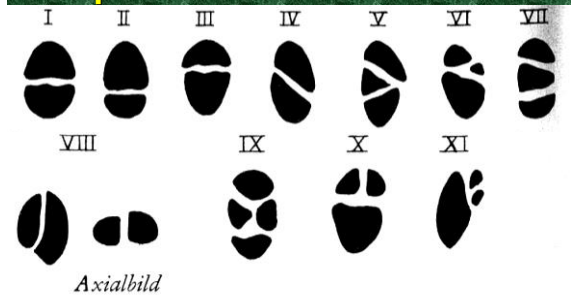


Diagramm 5: Typen der angetroffenen Teilungen, nach der Frequenz ihres Vorkommens geordnet.

From: Kewenter *Acta Orthop.Scand.Suppl.* 2, 1936, p48

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## Sesamoids of the Great Toe

### 4 Key Points

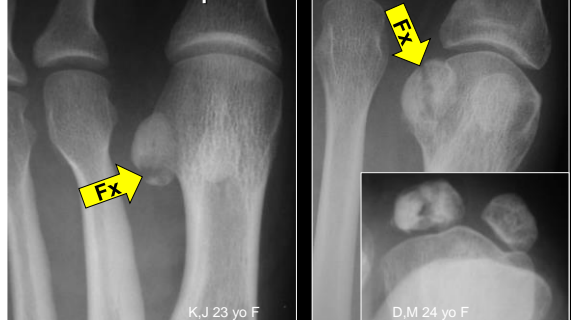
- 1) ALWAYS Present
- 2) Functionally Important
- 3) Lateral multipartite are RARE
  - Present in only ~1% of normals
  - If split lateral sesamoid c/w site of pain, I call it a fracture!

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## Sesamoids of the Great Toe

Lateral multipartite are RARE



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## Sesamoids of the Great Toe

### 4 Key Points

- 1) ALWAYS Present
- 2) Functionally Important
- 3) Lateral multipartite are RARE
  - Present in only ~1% of normals
  - If split lateral sesamoid c/w site of pain, I call it a fracture!
- 4) Medial multipartite are common
  - Present in at least 12% of normals
  - CAN STILL BE PAINFUL!
  - Consider bone scan

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## Case: 31yoM, medial Gr toe pain



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## Sesamoids of the Great Toe

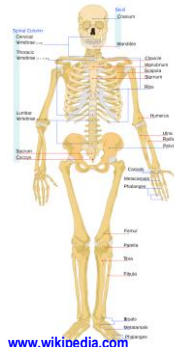
### 4 Key Points

- 1) ALWAYS Present
- 2) Functionally Important
- 3) Lateral multipartite are RARE
  - Present in only ~1% of normals
  - If split lateral sesamoid c/w site of pain, I call it a fracture!
- 4) Medial multipartite are common
  - Present in at least 12% of normals
  - CAN STILL BE PAINFUL!
  - Consider bone scan

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## Why don't the sesamoids have names?



206 named bones

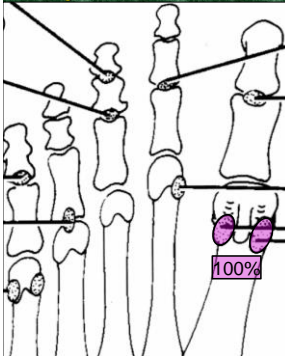
- **Patella** largest sesamoid bone has a name
- **Innominate bone** ("no name") has a name

[www.wikipedia.com](http://www.wikipedia.com)

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## Why don't the sesamoids have names?



1. Os tibiale externum
2. Processus uncinatus
3. Os intercuneiforme
4. Pars peronea metatarsalia
5. Cuboides secundarium
6. Os peroneum
7. **Os vesalianum** 0.1% Population
8. Os intermetarseum
9. Os supratalare
10. Talus accessorius
11. Os sustentaculum
12. Os trigonum
13. Calcaneus secundarius
14. Os subcalcis
15. Os supranaviculare
16. Os talotibiale

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## Perhaps they DO have a name...

THE BONE CALLED "LUZ" Rabbi Uschaia... 210 A.D.

New York Medical Journal  
INCORPORATING THE  
Philadelphia Medical Journal and The Medical News  
A Weekly Review of Medicine, Established 1843.

Vol. XCH, No. 4 NEW YORK, JULY 23, 1910. WHOLE No. 1651.

Original Communications.

THE BONE CALLED "LUZ"  
By FREDERICK H. GARDNER, M.D.,  
Washington, D. C.,  
Assistant Librarian, Surgeon General's Office.

fable is the Rabbi Uschaia, who lived 210 A. D., about which time he wrote the book called *Bereschit Rabbi*, i. e., *Glossa magna in Pentateuchum*, from which many later Rabbins have taken this fiction. This bone, they say, can never be burned or corrupted in all eternity, for its ground substance is of celestial origin and watered with the heavenly dew wherewith God shall make the dead to rise, as with yeast in a mass of dough. They insist, moreover, that this bone will outlast all the others be-

Among the many shafts of sarcasm which the author of *Hudibras* aimed at the Rump Parliament, the following, if it did not afford "laughter for a

bone will outlast all the others

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## Luz (bone)

Muslims and Jews believe this is the bone from which the body will be rebuilt at the time of resurrection, and share the belief that this bone does not decay.

➤ **Hebrew:** לֹז

➤ **Arabic:** عَجْبُ الدَّنَبِ 'ajbu adh-dhanab

[http://en.wikipedia.org/wiki/Luz\\_\(bone\)](http://en.wikipedia.org/wiki/Luz_(bone))

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## Genesis Rabbah xviii

the Rabbi took Luz and immersed it in water, but it was not softened;  
he put it into the fire, but it was not consumed;  
he put it into a mill, but it could not be pounded;  
he placed it upon an anvil and struck it with a hammer, but the anvil split and the hammer was broken.

[www.sacred-texts.com](http://www.sacred-texts.com)

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## Where is Luz?

End of the Spine?

- Coccyx?
- C7?
- Wormian skull bone?

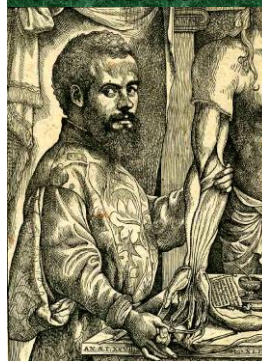
Sesamoids of Great Toe?

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## 1543: Vesalius - *De Humani Corporis Fabrica*



Sesamoids of the foot:

"these bones which magicians and followers of occult philosophy so often call to mind as being fashioned like a chickpea, liable to no decay, and which, buried in the earth after death, will (they affirm) reproduce man like a seed on the day of the Last Judgment."

"These bones, although of durable structure, may be burned or broken like other bones."

J Hist Med Allied Sci (1996) 51(1): 52-65

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## What have I learned?

Sesamoids of the Great Toe:

- Important... so look at them
  - ✓ Don't have a blind spot
- Not indestructible
  - ✓ Gout
- Not "Luz"
- Still don't have names...

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